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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,158	10/10/2006	Jean-Christophe Charlier	08960-0007	5335

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EXAMINER	
BARCENA, CARLOS	

ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,158	CHARLIER ET AL.	
	Examiner	Art Unit	
	Carlos Barcena	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-41 and 47-49* is/are pending in the application.

4a) Of the above claim(s) *25-41 and 47-49* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 04/23/2009 has been entered. Claims 22-41 and 47-49 remain pending. Claims 22, 24, 25, 47, and 48 have been canceled.

Election/Restrictions

2. Applicant's election with traverse of Group I (claims 22-24) in the reply filed on 04/23/2009 is acknowledged. The traversal is on the ground(s) that based on amendment, Groups I-II and VII share at least one common technical feature. This is not found persuasive because although the claims as amended now share a common technical feature, the express common technical feature does still not define a contribution which each of the inventions, as a whole, makes over the prior art. Accordingly, all of the pending claims depend directly or indirectly from claim 32 (a carbon nanostructure comprising a linear chain structure characterized by connected, substantially identical beads, wherein the beads are selected from spheres, bulb-like units and trumpet shaped units).

An updated review of the literature to Blank *et al.* (Carbon 28, 2000, 1217-1240) discloses such carbon nanostructures (Figs. 7-9a). The claimed technical feature does not define a contribution which each of the inventions, considered as a whole, makes over the prior art. Accordingly, the prior art of the record supports restriction of the claimed subject matter. The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

3. Claim 24 (lines t and u) is objected to because of the following informalities: superscript of units: "Nm3/h" should be replaced with --Nm^3/h--. Claim 24 is also objected because of punctuation errors. The preamble should end in a semicolon (i.e. "...is chosen from;" should be --...is chosen from:--. Also lines a, b, and c should end in a semicolon, not a comma. Line r recites "the gas temperature". It is uncertain which gas is being referred to. Appropriate correction is required.

4. Claim 22 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 22 is objected to because it calls to a succeeding claim.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "high temperature" in claim 22b, 22c, and 22g is a relative term which renders the claim indefinite. The term "high temperature" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. A specific temperature or temperature range would need to be provided. For the purpose of

examination, a temperature of plasma will (consistent with the specification) be utilize, i.e., 900-5000C

Claim Rejections - 35 USC § 102/103

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 22-24 are rejected under 35 U.S.C. 102(b) as anticipated by Fabry *et al.* (7,452,514) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fabry *et al.* (7,452,514).

Regarding claim 22, Fabry discloses a process for producing carbon containing compounds comprising:

a) generating a plasma gas through an electrical arc (col. 8, lines 20-21);

b) introducing a carbon precursor (a carbon containing feedstock) into the plasma gas in the reaction zone (col. 8, lines 27-28); the optional catalyst is added to the feedstock (col. 9, lines 1-2); the optional plasma carrier gas is added (col. 9,lines 3-5);

c) vaporization of the carbon precursor would be an inherent step in the process given the relative high temperature of the process (col. 9, lines 6-8);

d) guiding at least a fraction of the vaporized carbon precursor through an opening in a nozzle having an inlet and an outlet wherein the opening narrow toward the outlet (Fig. 1);

e) guiding at least a fraction of the vaporized carbon precursor into a quenching zone for nucleation wherein the quenching zone has an upper part and a lower part (Fig. 1);

f) generating flow conditions by aerodynamic or electromagnetic forces to reduce flow of the carbon precursor, the vaporized carbon precursor, the one or more catalysts, and the carrier plasma gas from the quenching zone to the reaction zone;

g) controlling the temperature of the upper part of the quenching zone at the very high temperature and the lower part of the quenching zone at a lower temperature to provide a quenching velocity between 10^3 K/S and 10^6 K/S:

h) quenching the fraction of vaporized carbon precursor guided into the quenching zone;

i) extracting at least one carbon nanostructure (col. 4, lines 49-51);

j) separating the at least one carbon nanostructure from at least one other reaction product (col. 4, lines 51-53).

Fabry does not expressly recited steps f-h; however, the process to Applicant's system and Fabry's system recite the same process steps, these steps would be inherent which would make a carbon structure as recited in instant claim 32. In the alternative, it would be expected the recited steps f-h be present because the process is substantially the same as Fabry; carbon nanostructure according to instant claim 32 would be produced.

Regarding claim 23, Fabry discloses wherein the electric arc is created by at least three electrodes (col. 8, lines 32-33).

Regarding claim 24, Fabry discloses:

a) the electrodes consist of graphite (col. 8, lines 44-45);

b) a current frequency between 50 Hz and 10 kHz (col. 8, lines 39-40);

c) the pressure is between 0.1 bar and 30 bar (col. 5, lines 28-29);

d) the opening in the nozzle has a surface consisting of graphite (col. 8, lines 44-45);

e) the nozzle comprises a continuous or stepped cone (Fig. 2).

Instant claim 24 requires wherein at least one of the recited limitations is chosen from a though cc. Recited limitations a-e cited above satisfies instant claim requirements.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Barcena whose telephone number is (571) 270-5780. The examiner can normally be reached on Monday through Thursday 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENGO/
Supervisory Patent Examiner, Art Unit 1793

/C. B./
Examiner, Art Unit 1793